

Amendment and Response

Applicant: David H. Hanes

Serial No.: 10/824,242

Filed: April 14, 2004

Docket No.: 200309081-1

Title: REDIRECTING I/O REQUEST TO REMOTE NETWORKED PERIPHERAL DEVICE

REMARKS

The following remarks are made in response to the Office Action mailed April 7, 2010. Claims 1, 2, 4-25, 27-36, 38, 40-43, and 45-48 were rejected. With this Response, claims 43 and 45-48 have been amended. Claims 1, 2, 4-14, 16-25, 27-36, 38, 40-43, and 45-48 remain pending in the application and are presented for reconsideration and allowance.

In the Title

Applicant would like to bring to the Examiner's attention that the title was previously amended in the Amendment and Response filed November 10, 2008. In the Final Office Action mailed January 13, 2009 the Examiner considered the amendments to the title and withdrew the objection to the Specification.

Applicant would appreciate if the Patent Office could update their database to reflect this title change.

Claim Rejections under 35 U.S.C. § 101

The Examiner rejected claims 43 and 45-48 under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter.

Amended claims 43 and 45-48 recite a non-transitory computer readable medium. Therefore, claims 43 and 45-48 are directed to statutory subject matter.

Therefore, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. § 101 rejection to the claims, and requests allowance of these claims.

Claim Rejections under 35 U.S.C. § 103

The Examiner rejected claims 1-2, 4-14, 16-23, 33-36, 43, and 45-48 under 35 U.S.C. § 103(a) as being unpatentable over the Heil et al. U.S. Patent No. 6,173,374 in view of the Miyoshi et al. U.S. Patent No. 6,901,451.

Independent claims 1, 13, 33, and 43 all include limitations related to redirecting an I/O request by automatically and transparent to a client application conveying an I/O request from the client application referencing a local peripheral address over a communication network to a remote peripheral device for processing of the I/O request. In addition, independent claims 1, 13, and 43 further define the above limitations with limitations related

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to replacing the local peripheral address of the I/O request with an address associated with the remote peripheral device; and independent claim 33 further defines the above limitations with limitations of means for inserting an address associated with the remote peripheral device into a drive command issued by the receiving means. The combination of the Heil et al. Patent in view of Miyoshi et al. Patent does not teach or suggest these limitations of independent claims 1, 13, 33, and 43.

The Examiner cites the Heil et al. Patent Figure 3 and col. 11, lines 45 to col. 12, line 7. The referenced language of the Heil et al. Patent discloses that peer-to-peer Host Bus Adapters (HBAs) “retrieve data corresponding to an I/O request for stored data blocks either locally or remotely.” After receiving a block I/O request 400, the 110 redirector has the means to search the directory and determining means to locate the local or remote disk drives that are storing the I/O requested blocks.” (Col. 11, lines 48-51.) As illustrated by Figure 3 and as disclosed in the corresponding text of the Heil et al. Patent, after the block I/O request (400) is received for data blocks stored either locally or remotely, the determination is made as to whether the blocks are local (420), and therefore retrieved from the respective local disk drive, or remote (450), and shipped to a remote HBA for processing. In contrast, the limitations of independent claims 1, 13, 33, and 43 receive **an I/O request from a client application** referencing a **local** peripheral address and **redirect the I/O request automatically and transparent to the client application** over a communication network to a remote peripheral device for processing of the I/O request, and in independent claims 1, 13, and 43 **replace the local peripheral address of the I/O request with an address associated with the remote peripheral device**; and in independent claim 33 **insert an address associated with the remote peripheral device into a drive command issued by the receiving means.**

The Heil et al. Patent discloses that “[p]rior to shipping the I/O block request, communications are established over the Fibre Channel backbone between the initial HBA and the remote HBA.” (Col. 11, lines 57-60.) Therefore, communication over the network must first be established, and then the I/O block request is sent. In contrast, independent claims 1, 13, 33, and 43 recite **automatically and transparent to the client application** conveying the I/O request from the client application over a communication network to a remote peripheral device for processing of the I/O request.

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Furthermore, the Examiner admits that the Heil et al. Patent does not teach the limitations of independent claims 1, 13, 33, and 43 related to an I/O request from a client application referencing a local peripheral address of a peripheral device for processing of the I/O request. Thus, the Examiner relies on the Miyoshi et al. Patent to teach the limitations of independent claims 1, 13, 33, and 43 of an I/O request from a client application referencing a local peripheral address of a peripheral device for processing of the I/O request and replacing the local peripheral address of the I/O request with an address associated with the remote peripheral device. The Miyoshi et al. Patent fails to teach or suggest these limitations.

The Miyoshi et al. Patent at col. 1, lines 55-57, discloses that a “means for transferring PCI bus transactions from a local node of a PCI bus to a PCI bus on a remote node over a network” is needed (col. 1, lines 55-57) and provided (col. 1, lines 61-63). (Emphasis added.) A PCI bus is defined as an “expansion bus that provides a communication path between a central processing unit (CPU) and a PCI device.” (Col. 1, lines 11-13.) By substituting the PCI bus definition into the above disclosure of Miyoshi et al. Patent provides a means for transferring a communication path transaction from a local node of a communication path to a communication path on a remote node over a network. Therefore, Miyoshi et al. Patent discloses communication between local and remote nodes. By contrast, independent claims 1, 13, 33, and 43 define an I/O request from a client application referencing a **local peripheral address of a peripheral device** for processing of the I/O request and **replacing the local peripheral address of the I/O request with an address associated with the remote peripheral device**.

Figure 5 of the Miyoshi et al. Patent illustrates a mapping of an address space of a local PCI bus to a direct memory access (DMA) of a remote PCI bus. The Miyoshi et al. Patent at Col. 10, lines 27-38, discloses local PCI address space 505 includes addresses of remote I/O devices as well as a memory mapping I/O and node IDs mapped to a DMA in remote PCI address space 510 in each remote node. Destination node ID and destination address translation can be performed to derive the corresponding DMA space from a particular node ID. This disclosure in the Miyoshi et al. Patent does not teach or suggest the limitations of independent claims 1, 13, 33, and 43 related to automatically and transparent to the client application **replacing the local peripheral address of the I/O request with an address associated with the remote peripheral device**.

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In view of the above, the Heil et al. Patent, the Miyoshi et al. Patent, and the Hewlett Patent alone or in combination do not teach or suggest all of the limitations of independent claims 1, 13, 33, and 43. Therefore, the Examiner has not established a *prima facie* case of obviousness for these independent claims. Furthermore, dependent claims 2 and 4-12 further define patentably distinct independent claim 1. Dependent claims 14 and 16-23 further define patentably distinct independent claim 13. Dependent claims 34-36 further define patentably distinct independent claim 33. Dependent claims 45-48 further define patentably distinct independent claim 43. Therefore, these dependent claims are also believed to be allowable.

Therefore, Applicant that the rejection of claims 1-2, 4-14, 16-23, 33-36, 43, and 45-48 under 35 U.S.C. § 103 be removed and that these claims be allowed.

The Examiner rejected claims 24-25, 27-32, 38, and 40-42 under 35 U.S.C. § 103(a) as being unpatentable over the Heil et al. U.S. Patent No. 6,173,374 and the Miyoshi et al. U.S. Patent No. 6,901,451 in view of the Hewitt U.S. Patent No. 5,987,541.

Independent claims 24 and 38 include limitations related to redirecting a drive command by automatically and transparent to a client application formatting a drive command from the client application to record data to an optical medium for processing by a remote optical drive. Independent claims 24 and 38 further define the above limitations with limitations related to automatically replacing a local peripheral address associated with the drive command with an address associated with the remote optical drive. The combination of the Heil et al. Patent, the Miyoshi et al. Patent, and the Hewitt Patent does not teach or suggest these limitations of independent claims 24 and 38.

The Examiner cites the Heil et al. Patent Figure 3 and col. 11, lines 45 to col. 12, line 7. The referenced language of the Heil et al. Patent discloses that “peer-to-peer HBAs retrieve data corresponding to an I/O request for stored data blocks either locally or remotely. After receiving a block I/O request 400, the 110 redirector has the means to search the directory and determining means to locate the local or remote disk drives that are storing the I/O requested blocks.” (Col. 11, lines 48-51.) As illustrated by Figure 3 and as disclosed in the corresponding text of the Heil et al. Patent, after the block I/O request (400) is received for data blocks stored either locally or remotely, the determination is made as to whether the

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blocks are local (420), and therefore retrieved from the respective local disk drive, or remote (450), and shipped to a remote HBA for processing. In contrast, the limitations of independent claims 24 and 38 receive a **drive command from a client application** to record data to an optical medium and **format the drive command automatically and transparent to the client application for processing by a remote optical drive and replace a local peripheral address associated with the drive command with an address associated with the remote optical drive.**

The Heil et al. Patent discloses that “[p]rior to shipping the I/O block request, communications are established over the Fibre Channel backbone between the initial HBA and the remote HBA.” (Col. 11, lines 57-60.) Therefore, communication over the network must first be established, and then the I/O block request is sent. In contrast, independent claims 24 and 38 recite **automatically and transparent to the client application** formatting the drive command from the client application for processing by the remote optical drive.

The Miyoshi et al. Patent and the Hewitt Patent do not cure the above deficiencies of the Heil et al. Patent. Concerning the rejection of independent claim 1, the Examiner admits that the Heil et al. Patent does not teach the limitations of independent claim 1 related to an I/O request from a client application referencing a local peripheral address of a peripheral device for processing of the I/O request. Thus, the Examiner relies on the Miyoshi et al. Patent to teach the limitations of independent claim 1 of an I/O request from a client application referencing a local peripheral address of a peripheral device for processing of the I/O request and replacing the local peripheral address of the I/O request with an address associated with the remote peripheral device.

Similarly, the Examiner relies on the Miyoshi et al. Patent to teach the limitations of independent claims 24 and 38 related to a **local peripheral address** associated with a drive command from a client application at a **host device** to record data to an optical medium and **automatically replace the local peripheral address** associated with the drive command **with an address associated with the remote optical drive.** The Miyoshi et al. Patent does not teach or suggest these limitations of independent claims 24 and 38.

The Miyoshi et al. Patent at col. 1, lines 55-57, discloses that a “means for transferring PCI bus transactions from a local node of a PCI bus to a PCI bus on a remote node over a network” is needed (col. 1, lines 55-57) and provided (col. 1, lines 61-63).

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(Emphasis added.) A PCI bus is defined as an “expansion bus that provides a communication path between a central processing unit (CPU) and a PCI device.” (Col. 1, lines 11-13.) By substituting the PCI bus definition into the above disclosure of Miyoshi et al. Patent provides a means for transferring a communication path transaction from a local node of a communication path to a communication path on a remote node over a network. Therefore, Miyoshi et al. Patent discloses communication between local and remote nodes. By contrast, independent claims 24 and 38 define a **local** peripheral address associated with a **drive command** from a client application at a **host device** to record data to an **optical medium** and **automatically replace the local peripheral address** associated with the drive command **with an address associated with the remote optical drive**.

Figure 5 of the Miyoshi et al. Patent illustrates a mapping of an address space of a local PCI bus to a direct memory access (DMA) of a remote PCI bus. The Miyoshi et al. Patent at Col. 10, lines 27-38, discloses local PCI address space 505 includes addresses of remote I/O devices as well as a memory mapping I/O and node IDs mapped to a DMA in remote PCI address space 510 in each remote node. Destination node ID and destination address translation can be performed to derive the corresponding DMA space from a particular node ID. This disclosure in the Miyoshi et al. Patent does not teach or suggest the limitations of independent claims 24 and 38 related to transparent to the client application **automatically replace the local peripheral address** associated with the drive command **with an address associated with the remote optical drive**.

The Examiner cites the Hewitt Patent merely for disclosing a computer system which discloses an optical drive (i.e., CD-ROM drive 132) on a PCI bus 120 in Figure 1. The Hewitt Patent, however, does not teach or suggest the limitations of independent claims 24 and 38 related to receiving a drive command from a client application to record data to an optical medium and formatting the drive command automatically and transparent to the client application for processing by a remote optical drive and replacing a local peripheral address associated with the drive command with an address associated with the remote optical drive.

In view of the above, the Heil et al. Patent, the Miyoshi et al. Patent, and the Hewlett Patent alone or in combination do not teach or suggest all of the limitations of independent claims 24 and 38. Therefore, the Examiner has not established a *prima facie* case of obviousness for these independent claims. Furthermore, dependent claims 25 and 27-32

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further define patentably distinct independent claim 24. Dependent claims 40-42 further define patentably distinct independent claim 38. Therefore, these dependent claims are also believed to be allowable.

Therefore, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. § 103(a) rejections to claims 24-25, 27-32, 38, and 40-42 and requests allowance of these claims.

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CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 1, 2, 4-14, 16-25, 27-36, 38, 40-43, and 45-48 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 1, 2, 4-14, 16-25, 27-36, 38, 40-43, and 45-48 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 08-2025.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Patrick G. Billig at Telephone No. (612) 573-2003, Facsimile No. (612) 573-2005.

Respectfully submitted,

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